

African Mineral Standards

Gold and Uranium Ore Witwatersrand Reference Material Ore Grade

AMIS0079

Certificate of Analysis

Recommended Concentration and two "Between Laboratory" Standard Deviations

Certified Concentrations

Au (Pb Collection)	4.87	+ -	0.36	g/t
U (M/ICP)*	243	+ -	29	ppm
U (XRF)*	244	+ -	16.3	ppm
Specific Gravity	2.88	+ -	0.16	g/cc

* Or, by applying a chemical conversion factor of $U \times 1.1793 = U_3O_8$
 U_3O_8 by multi acid digestion: 287 ± 34 ppm
 U_3O_8 by XRF: 288 ± 19 ppm

Intended use: AMIS0079 is suitable for monitoring the accuracy of a single analysis of gold ores hosted by siliceous rocks. The material can be used for routine quality control by inserting within a batch of samples.

The recommended mean and "Between Lab" standard deviations for this standard reflect the average results from the laboratories that participated in the round robin. Slight variations in analytical procedures between laboratories will reflect as slight biases to the recommended concentrations and this is acceptable. Good laboratories however will report results within the two standard deviation levels with a failure of <10 %.

Origin of material: This standard is a blend of Ventersdorp Contact Reef, Carbon Leader Reef and Vaal Reef material provided by Anglo Gold Ashanti in South Africa. It was made from a mixture of pulp reject sample material, collected during routine underground sampling, sourced from mine assay laboratories and blended down to a required grade with silica.

Mineral and chemical composition: The major gangue mineral is quartz with minor pyrite, uraninite and thucolite. Gold occurs primarily as discrete grains.

The major element chemistry has been calculated, from predominantly XRF data submitted by fourteen of the laboratories, from the eight samples sent each lab. Uncertified statistics from this data are:

	mean	2SD	RSD%	n	Unit
Al ₂ O ₃	15.29	0.50	1.6	88	%
CaO	8.29	0.34	2.1	108	%
Cr ₂ O ₃	0.07	0.01	6.0	92	%
Fe ₂ O ₃	8.18	0.27	1.7	95	%
K ₂ O	0.54	0.01	1.4	95	%
MgO	5.54	0.16	1.5	96	%
MnO	0.24	0.02	3.6	80	%
Na ₂ O	1.63	0.14	4.2	96	%
P ₂ O ₅	0.039	0.017	21.8	62	%
S	0.84	0.28	16.5	46	%
SiO ₂	56.9	0.8	0.7	88	%
TiO ₂	0.202	0.019	4.6	96	%
V ₂ O ₅	0.014	0.008	28.0	24	%
LOI	2.19	0.22	5.1	72	%

Appearance: The material is a very fine powder coloured Light Grey (Corstor 5Y 7/1).

Radioactivity: Shipments of this material do not require special marking, labeling or placarding. AMIS0080 does contain U (3.1 Bq/g) and Th (0.11 Bq/g) but due to the low activity concentrations it is classified as EXEMPT MATERIAL in terms of "Safety Standards Series No. TS-R-1: Regulations for the Safe Transport of Radioactive Material, International Atomic Energy Agency, 2005, para 403, Table 1".

Method of preparation: The material was crushed, dry-milled and air-classified to 100% <54µm. Wet sieve particle size analysis of random samples confirmed the material was 100% <54µm. It was then blended in a bi-conical mixer, systematically divided and then sealed into 1kg Laboratory Packs. Samples were randomly selected for homogeneity testing and third party analysis. Statistical analysis for

the consensus test results were carried out by an independent statistician. Explorer Packs are subdivided from the Laboratory packs as required.

Methods of analysis requested:

1. Au – Pb collection ICP-OES or ICP-MS.
2. Multi-acid digest U ICP- OES or ICP-MS.
3. U XRF.
4. Majors (Al₂O₃, CaO, Cr₂O₃, Fe₂O₃, K₂O, MgO, MnO, Na₂O, SiO₂, TiO₂. LOI.) XRF fusion.
5. SG (gas pycnometer)

Method of certification: Twenty two laboratories were each given eight randomly selected packages of sample. The results from the twenty laboratories that issued results timeously were used for the certification.

The mean and standard deviation for all data was calculated. Outliers were defined as samples beyond the mean \pm 2 Standard Deviations from all data. These outliers were removed from the data and a new mean and standard deviation was determined.

Standards with an RSD of near or less than 5 % are then certified, RSD's of between near 5 % and 15 % are given Provisional Concentrations and limits, those with RSD's over 15 % are given Indicated Concentrations.

This method is different from that used to calculate the Confidence Interval shown on many Government-produced standards in that the actual "between-laboratory" standard deviation is used in the calculations. This produces upper and lower limits that reflect actual individual analyses rather than a grouped set of analyses. The limits can therefore be used to monitor accuracy from individual analyses, unlike the Certified Limits published on other standards which quote a Confidence Interval.

Participating laboratories: (Not in same order as in the table of assays)

1. ACME Analytical Laboratories Ltd., (Canada).
2. Activation Laboratories Ltd., (ActLabs, Ancaster, ON, Canada).
3. AGA - West Wits Laboratory, (South Africa).
4. AGA - Navachab Gold Mine Laboratory, (Namibia).
5. AGA - Vaal River Laboratory (South Africa).
6. ALS Chemex South Africa (Pty) Ltd.
7. ALS Chemex, (Perth, Australia).
8. ALS Chemex, (Vancouver, Canada).
9. Assayers Canada, (Vancouver, Canada).
10. Labtium Inc. (Finland).
11. MAED Laboratories - Knights (South Africa)
12. OMAC Laboratories (Ireland).
13. Performance Laboratories, (South Africa).
14. Pt Intertek Utama Services (Intertek, Indonesia)
15. Set Point Laboratories (Pty) Ltd (South Africa)
16. SGS Lakefield Research (Canada)
17. SGS Lakefield Research Africa (Pty) Ltd. (Johannesburg, South Africa)
18. SGS Mineral Services – (Barberton, South Africa).
19. SGS Welshpool (Perth, Australia).
20. Ultra Trace (Pty) Ltd. (Perth, Australia).

Assay Data: Data as received from the laboratories is set out below. A proficiency report has been sent to the managers of the participating laboratories.

Laboratory Code	Au (Pb Collection) g/t	U (M/ICP) ppm	U (XRF) ppm	Specific Gravity g/cc
A	4.82	230	248	2.96
A	4.83	230	246	2.93
A	5.34	230	248	2.94
A	4.83	230	250	2.94
A	4.80	240	249	2.92
A	5.09	230	251	2.94
A	4.86	230	248	2.91
A	4.89	230	250	2.94
B	4.77	254	280	2.96
B	4.95	252	280	2.98
B	4.58	251	280	2.95
B	4.68	255	290	2.96
B	4.64	255	290	2.95
B	4.80	250	280	2.98
B	5.02	253	280	2.97
B	4.91	255	270	2.97
C				
C				
C				
C				
C				
C				
C				
C				
C				
D	4.80			
D	4.78			
D	4.90			
D	4.86			
D	4.64			
D	5.08			
D	4.89			
D	4.58			
E	5.29	233	210	2.62
E	5.36	239	210	2.58
E	5.21	240	210	2.63
E	5.23	230	210	2.61
E	5.58	215	210	2.64
E	5.35	217	220	2.65
E	5.23	247	210	2.61
E	4.98	255	210	2.62
F	4.42		232	
F	4.14		232	
F	4.36		225	
F	4.18		227	
F	4.44		209	
F	4.22		236	
F	4.28		227	
F	4.40		229	
G	4.73	210	252	2.98
G	4.97	213	247	2.96
G	4.83	201	250	2.95
G	5.04	215	251	2.93
G	4.85	233	245	2.92
G	4.77	226	254	2.94
G	4.98	220	249	2.89
G	4.95	216	249	3.00
H	4.60			
H	4.82			
H	4.74			
H	5.14			
H	4.96			
H	5.00			
H	4.76			
H	4.78			

Laboratory Code	Au (Pb Collection) g/t	U (M/ICP) ppm	U (XRF) ppm	Specific Gravity g/cc
I	4.99	257		2.81
I	4.64	247		2.79
I	4.73	253		2.80
I	5.04	252		2.78
I	4.83	249		2.82
I	4.95	254		2.83
I	4.74	254		2.82
I	4.79	239		2.82
J	4.37	235	248	
J	4.57	263	244	
J	4.67	265	248	
J	4.30	269	257	
J	4.37	245	248	
J	4.67	265	249	
J	4.33	258	253	
J	4.43	261	250	
K	5.09	237		2.83
K	5.17	244		2.79
K	5.20	237		2.81
K	5.04	237		2.78
K	5.17	232		2.82
K	5.11	241		2.78
K	5.02	244		2.77
K	4.98	227		2.80
L	4.99	196	243	
L	4.82	207	238	
L	4.70	188	238	
L	4.98	198	241	
L	4.65	188	239	
L	4.83	197	240	
L	4.97	196	241	
L	5.12	191	248	
M	4.51	238	239	2.80
M	4.26	245	235	2.89
M	4.73	236	233	2.84
M	4.91	222	238	2.77
M	4.89	246	242	2.85
M	4.78	236	241	2.82
M	4.78	223	235	2.78
M	4.80	233	237	2.89
N	4.93	303	280	2.93
N	4.82	305	281	2.93
N	4.72	329	286	2.92
N	4.67	328	286	2.93
N	4.67	311	287	2.92
N	4.91	327	290	2.94
N	4.84	329	290	2.92
N	4.76	316	290	2.94
O	4.90		243	
O	4.97		246	
O	4.95		246	
O	4.90		247	
O	4.80		245	
O	5.19		248	
O	5.11		245	
O	5.00		248	
P	4.49			
P	4.90			
P	4.79			
P	4.63			
P	4.73			
P	4.63			
P	4.60			
P	4.29			

Laboratory Code	Au (Pb Collection) g/t	U (M/ICP) ppm	U (XRF) ppm	Specific Gravity g/cc
Q	4.87	248		
Q	4.77	262		
Q	4.81	250		
Q	5.02	244		
Q	5.03	243		
Q	5.00	245		
Q	4.73	255		
Q	5.11	240		
R	4.68			
R	4.92			
R	4.96			
R	5.04			
R	5.20			
R	5.00			
R	5.12			
R	5.16			
S	4.28			
S	4.45			
S	4.49			
S	4.44			
S	4.25			
S	4.14			
S	4.34			
S	4.41			

Laboratory Code	Au (Pb Collection) g/t	U (M/ICP) ppm	U (XRF) ppm	Specific Gravity g/cc
T	4.96	244		
T	4.92	241		
T	4.75	244		
T	4.88	244		
T	5.02	240		
T	4.75	243		
T	4.84	237		
T	4.59	239		
U				
U				
U				
U				
U				
U				
U				
U				
V	4.94	270	280	3.64
V	4.77	270	280	3.57
V	4.86	290	270	3.61
V	5.01	280	280	3.61
V	4.86	290	280	3.62
V	4.73	270	280	3.59
V	4.99	270	280	3.61
V	4.72	270	280	3.61

Availability: This product is available in Laboratory Packs containing 1kg of material or in Explorer Packs containing client specified weights of material from 50g up to 250g. Laboratory Packs are sealed bottles delivered in sealed foil pouches. Explorer Packs contain material in standard geochem envelopes placed into foil pouches that are nitrogen flushed and vacuum sealed.

Legal notice: This certificate and the reference material described in it have been prepared with due care and attention. However AMIS, Set Point Technology (Pty) Ltd, Mike McWha, Dr Barry Smee and Smee and Associates Ltd; accept no liability for any decisions or actions taken following the use of the reference material.

30 April 2008

Certifying officers:



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